UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB1999-0118

July 1, 1999

Karen Kochenbach
Corps of Engineers
Portland District
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Biological Opinion for the Corvallis Bank Protection Project in the Willamette River

Dear Ms. Kochenbach:

The National Marine Fisheries Service (NMFS) has enclosed the Biological Opinion (Opinion) for the proposed project to stabilize 2,600 feet of bank along the Willamette River using a bioengineered approach. This project will integrate rock riprap and stabilized grids of vegetation and soil. This project is described in the Corps of Engineers (Corps) Biological Assessment (BA) prepared by the City of Corvallis and submitted with the request for consultation in the Corps letter of June 18, 1999.

This Opinion considers the Upper Willamette River chinook salmon (*Oncorhynchus tshawytscha)* which occur in the proposed project area. Upper Willamette River chinook salmon were listed as threatened under the ESA by NMFS (March 24, 1999, 64 FR 14308). Critical habitat has been proposed for the Upper Willamette River chinook salmon (March 9, 1998, 63 FR 63, 11482) and includes the current fresh water range within the Willamette River basin downstream along the Columbia River. This habitat includes the water, substrate, and adjacent riparian zone.

This Opinion constitutes formal consultation for the Upper Willamette River chinook salmon. If you have any questions regarding this letter, please contact Jim Turner at (503) 231-6894.

Sincerely,

William Stelle, Jr.
Regional Administrator

Enclosure

cc: John Marshall USFWS
Steve Mamoyac ODFW
Patty Caswell DSL
Tom Melville DEQ

Endangered Species Act - Section 7
Consultation

BIOLOGICAL OPINION

CORVALLIS BANK STABILIZATION - WILLAMETTE RIVER

Action Agency: Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: July 1, 1999

Refer to: OSB1999-0118

TABLE OF CONTENTS

I. Background

On April 16, 1999, the National Marine Fisheries Service (NMFS) received an advanced copy of a biological assessment (BA) prepared by CH2M Hill for the City of Corvallis. The NMFS entered into early consultation with the Corps of Engineers (Corps) and the City of Corvallis under the Endangered Species Act (ESA), section 7, for bank stabilization actions along the Willamette River. The City of Corvallis and the Corps have provided additional information as requested necessary for completing the consultation throughout the early consultation period. The request for consultation and all the necessary information was received from the Corps on June 18, 1999. This Biological Opinion (Opinon) is based on the information presented in the BA and the planning documents provided by the City of Corvallis and their consultants, referred to as the City throughout this document.

The Corps has determined that the Upper Willamette River chinook salmon *(Oncorhynchus tshawytscha)* may occur within the project area. The Corps is evaluating the request of the City to stabilize approximately 2,600 feet of bank along the Willamette River using an engineered approach that integrates rock riprap and vegetated soil cells (geogrids) to rebuild the bank. The proposed activity is necessary to stop further degradation of the bank-line; protect an existing transportation and utility corridor within Corvallis; and to maintain the integrity of the City's plans to integrate waterfront redevelopment. These actions were determined to affect the indicated species. The effects determination was made using the methods described in *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996) and NMFS guidance concerning the potential adverse effects of bank stabilization techniques. The Corps determined that the proposed actions were likely to adversely affect the indicated species.

The NMFS has evaluated and discussed the need for the proposed action with the City. The City identified an erosion problem along the Willamette River at the project site including 1,600 feet of active erosion. Based on analysis of aerial photography and various historic records, the City has calculated that the rate of erosion is approximately 1 foot per 3 years. Random and miscellaneous filling has occurred over time at the project site. Past fills were composed of unconsolidated rubble, concrete and other material. This circumstance has increased the complexity and the scope of the proposed action. The City has indicated that the stream bank and shoreline are vulnerable to flooding which can infiltrate and undercut the stream bank. A flooding event will saturate the bank material, lead to seepage, and cause the stream bank to slump, particularly where the bank is steep or where the river has undercut the toe of the bank. Continuing erosion at the current rates will threaten the function and utility of the road and sewer line adjacent to the bank in the near future, and compromise the City's redevelopment plans for the site.

The NMFS evaluated and discussed alternatives for the proposed action with the City. The City designed the proposed action with input from the local community and various state and Federal agencies. The design options varied from maintaining current configuration of the bank to modifying and reconfiguring the bank by reducing the slope. The City preferred to maintain the current

configuration of the bank. The City felt that reconfiguring the bank would conflict with the existing road, utilities, and businesses; and it would limit park development options.

The City designed the project to specifically address the erosion problem by creating an engineered stable bank, which would also reestablish a natural, vegetated stream bank. One of the goals of the project identified during public input was to utilize native vegetation to create a stable bank that would be consistent with the needs of fish and wildlife. All design alternatives considered were based on rock riprap at the toe of the bank. Treatment of the upper bank varied from the simple vegetation planting to the more complex use of vegetated soil cells (geogrid). The City evaluated the hydraulic conditions to determine the extent the rock toe protection on the bank. They determined that based on the calculated shear stress of the river, rock should be placed to a elevation of 201 feet (30% design document, p. 3-2). The City adjusted the design elevation to 203.5 feet based on professional judgement. By extending the rock treatment up the bank, the City was able to save a number of trees that would otherwise be removed during reconstruction of the bank. The City evaluated the upper bank and determined that the soil was unstable under the flooding and receding flows of the Willamette River. They considered the state of the trees on the upper bank. Many of the trees were stressed, dying, or apparently ready to fall. The City determined these conditions required a more extensive treatment and restructuring of the bank. The geogrid provides the very stable bank that compliments the rock riprap along the lower bank and allows extensive revegetation.

The NMFS expressed concern that the preferred option did not adequately consider the opportunity to restore the bank to a more natural state. The NMFS recognized the need to stabilize the bank. If not done now, it would become more necessary, and more urgent, in the future. The primary advantage in conducting the work now is to minimize the loss of bank, and better consider options for improving conditions along the river. The NMFS asked the City to clarify the need to treat the whole length of the bank. The City reiterated that without a continuous bank treatment that the hydraulic conditions along the bank become more complex and increase instability at those unprotected areas. The NMFS asked the City to reevaluate pulling back or sloping the bank to a more natural condition. The City explained that sloping the bank to the extent that would be of most benefit to the stream condition was not feasible within the available space, particularly along the south end of the project site. At the north end of the project site, the width of the upper bank was greater (apparently partially due to previous landfill material). The NMFS specifically requested that the City consider modifying the bank configuration at the north end of the project. The City indicated that changing the configuration at the north end and pulling back the bank line would create complex hydraulic conditions and may not be stable.

The NMFS raised additional questions concerning the effect of the project on stream functions and juvenile salmonid habitat. The City worked with ODFW to develop a design to benefit chinook salmon. The City incorporated large rock structures and large wood into the design. The NMFS asked the City to look upstream and downstream of the project and consider the opportunities for juvenile salmonids to find habitat for rearing. The City reported that the areas up and down stream varied in quality, but that substantial portions of the bank have been previously modified or stabilized,

particularly along the west bank. The City also indicated that their approach to bank stabilization would not necessarily adversely impact salmonid habitat. They have incorporated conservation measures into the project design. These measures include using larger rock than would be necessary to stabilize the bank and constructing rock barbs that create irregularities along stream edge. The City has agreed to work directly with NMFS in the future to consider appropriate and additional in-stream work to augment the proposed project to benefit juvenile salmonids.

The NMFS recognizes that the City has made considerable effort to evaluate alternatives as constrained by proximity of the bank to the road and utility corridor and park redevelopment. The City has made a good faith effort to design the project over the last few years to meet community needs and be compatible with the Willamette River system. The NMFS prefers bank stabilization projects that more effectively restores ecological functions and conditions that support listed fish. The NMFS will continue to emphasize alternatives that achieve those conditions where feasible.

The objective of this Opinion is to determine whether the action to stabilize approximately 2,600 feet of bank along the Willamette River, using bioengineering techniques, is likely to jeopardize the continued existence of the indicated species or destroy or adversely modify critical habitat.

II. Proposed Actions

The City has proposed to stabilize 2,600 feet of bank along the Willamette River using a bioengineering approach that integrates rock riprap, reinforced soil and vegetation bundles (geogrids) and rock barbs (large rock groins projecting into the stream and oriented up-stream). The proposed project will secure and harden the stream bank reducing erosion by increasing the bank's resistance to hydraulic stress and redirecting flows at the site. The following further describes the project elements:

Bank Stabilization Treatment (3 zones). There are three treatment zones identified for this project. These zones are delineated by elevation and position on the bank. zone 3, the lower zone, is from elevation 185 to 203.5 feet. Zone 3 consists of rock riprap, 700 class. The City will place approximately 10,000 cubic yards of rock along the bank in zone 3. Zone 2 consists of geogrid and is from elevation 203.5 to 218.5 feet. The geogrid structure will require the excavating the bank 12 feet deep to remove all unstable material. The geogrid is a reinforced soil and vegetation element. It is approximately 12 feet wide and 2.5 foot thick of variable length along the bank. The geogrid directly incorporates live branch material from native riparian trees and shrubs. zone 1 is similar to the treatment of zone 2 and will vary in width from elevation 218.5 up to 226 feet.

Rock Barbs. In addition to the placement of rock riprap, the City will construct 4 rock barbs in zone 3 using large rock, 1000 to 2000 class. These barbs will be located in the upper reach of the bank stabilization project. They will be approximately 30 feet long by 8 feet high by 20 feet wide. The total

amount of rock will be approximately 500 cubic yards. The barbs will be oriented upstream into the current to deflect the river and create eddy or backwater areas.

Construction Methods. The City will begin the bank reconstruction from the water and move up the bank. They will excavate a toe trench and place rock riprap in zone 3 from the water, using cranes or other barge mounted equipment. The staging area for the in-water construction will be on the east bank of the river. The City will construct a temporary landing site including a gravel ramp. The rock riprap will be processed, as needed, at the staging area before being loaded onto the barges for delivery to the west bank. After completion of the in-water work, the City will restore the staging area by removing gravel ramp and replanting all disturbed areas with native plants. The City will continue to implement the bank reconstruction for zone 1 & 2. They will remove the bank material and all vegetation along the upper bank using large excavating equipment located at the top of the bank. After the bank has been prepared the City will place the geogrid and integrate live willow or cottonwood into the rock and geogrid structure.

Conservation Measures. The project will incorporate various conservation measures. These will include the use of clean riprap; conducting in-water work during the period of time when indicated fish species are less likely to be present (ODFW in-water work period); accessing the construction site by barge to preserve trees along the ordinary high water line; implementing an erosion prevention and stormwater treatment plan; and incorporating extensive plantings of native vegetation along the bank from top of bank, zone 1 throughout zone 3.

The action area for this proposal provides the geographic extent and basis for evaluating the effects of the proposal for this Opinion. The direct and indirect effects of the proposed action define the action area. The proposed action will have a direct effect at the immediate project site from construction and modification to the streambed and bank. Temporary increases in turbidity from the project are expected to be limited to the area immediately downstream of the project. Effects to temperature, hydrology, and source of wood debris due to this project are considered minimal and difficult to significantly detect downstream. For the purposes of this Opinion, the action area consists of the immediate project site and reach of the Willamette River 300 feet downstream.

III. Biological Information and Critical Habitat

The following references provide information regarding the listing status, biological requirements, and critical habitat elements or potential critical habitat for the Upper Willamette River chinook salmon.

- Biological information -- Myers et. al. 1998
- Listing information -- Upper Willamette River chinook salmon were listed as threatened under the ESA by NMFS, March 24, 1999, 64 FR 14308.

- Critical habitat information -- Critical habitat has been proposed for the Upper Willamette River chinook salmon March 9, 1998, 63 FR 63, 11482, and includes the current fresh water range within the Willamette River basin, downstream along the Columbia River. This habitat includes the water, substrate, and adjacent and riparian zone.

The NMFS is concerned over the low abundance and declining population trend for the Upper Willamette spring chinook. Habitat loss has contributed to the decline of Upper Willamette River spring chinook. Essential stream features critical to the survival and recovery of chinook are secondary and high water channels; interconnection between stream, flood plain and riparian areas; water quality, including temperature, turbidity and suspended sediment; and hydrology and flow regimes.

IV. Evaluating Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributable to (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NMFS finds that the action is likely to jeopardize, NMFS must identify reasonable and prudent alternatives for the action.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' critical habitat. The NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. The NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. The NMFS then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If NMFS concludes that the action will adversely modify critical habitat it must identify any reasonable and prudent measures available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for adult and juvenile migration of the listed salmon under the existing environmental baseline.

A. Biological Requirements

The first step in the method NMFS uses for applying the ESA standards of Section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NMFS starts with the determinations made in its decision to list the particular species for ESA protection and also considers new data available that is relevant to those determinations (see references Section III - Biological Information and Critical Habitat).

The relevant biological requirements are those necessary for the listed species to survive and recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stocks, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The biological requirements for indicated species include:

- stream conditions that allow unimpaired access to stream habitat;
- clean cool water for spawning and rearing;
- streambed composed of gravels with low percentage of fine sediments;
- moderated flows that extend over winter and summer seasons;
- off-channel winter refuge areas;
- in-stream structure of boulders or large wood that will diversify flows regimes and create pool and riffle habitat for feeding and hiding;
- intact riparian area vegetated with trees and shrubs to provide shade and source of food;
- sufficient numbers of returning spawning fish to sustain healthy populations.

The abundance of Upper Willamette River spring chinook has declined. From 1950's to present the numbers of naturally produced fish to have significantly declined. The short term trend indicates continual decline for the ESU as a whole (see references in Section III - Biological Information and Critical Habitat.) The BA has indicated that there is an increasing trend at Leaburg dam, McKenzie River (BA, p 10). The NMFS is evaluating this trend. Much of the increase at the McKenzie River is due to curtailed fisheries. It appears that the total return of wild chinook entering the Columbia are similar for 1995, 1996 and 1998. The McKenzie River is the main source of natural production in the Upper Willamette River Basin. Current spring chinook populations are primarily of hatchery origin. The NMFS remains concerned over population trends.

B. Environmental Baseline

The environmental baseline represents a basal set of conditions defined by the action area. This area represents less than 1% of the range of the species ESU (visual estimation of area of ESU). Baseline

conditions have been assessed using the methods described in *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996).

Agriculture use and urban development have substantially affected the Willamette River. The Willamette River is a large river system. Previous development and system alternations have effectively channelized the Willamette River resulting in the loss of secondary channels, backwater areas, and interconnection to the flood plain. Alternations to riparian areas have changed the vegetative community and physical functions. Dams located on the major tributaries within the Willamette River Basin significantly alter the flow patterns (Univ. of Oregon 1998)

The NMFS used the matrix of pathways and indicators (NMFS 1996) to evaluate the baseline. Stream functional elements that were considered at risk, or not functioning include temperature, sediment, large woody debris, refugia and off-channel habitat, floodplain interaction, peak flows, and watershed disturbance.

Based on the best available information on the current status of the indicated fish species; the population status, trends, and genetics (as referenced in Section III - Biological Information and Critical Habitat); and the poor environmental baseline conditions within the action areas, NMFS concludes that the biological requirements of the identified fish species within the action area are not currently being met and habitat conditions are continuing to decline and affect the general decreasing trend in population. Improvement in habitat conditions is needed to meet the biological requirements for survival and recovery of these species. Actions that do not maintain or improve conditions toward properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of anadromous salmonids

V. Analysis of Effects

The effects determination in this Opinion was made using a method for evaluating current aquatic conditions, the environmental baseline, and predicting effects of actions on them. This process is described in the document *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). This assessment method was designed to provide adequate information for NMFS to determine the effects of actions subject to consultation.

A. Effects of Proposed Actions

For each individual element of the proposed action covered in this Opinion, the effects on aquatic habitat factors and to species considered in this Opinion can be limited by utilizing construction methods and approaches that are intended to minimize impacts. The NMFS evaluated the effects of the proposed project on the biological requirements of the listed species based on the expected effectiveness of proposed minimization and avoidance measures described in the BA. Of particular importance are timing of actions to the preferred in-water work period (established by Oregon Department of Fish and Wildlife); implementing erosion control measures; limiting disturbance of riparian areas, stream bank and bed; and minimizing direct discharge of sediments or pollutants into the stream.

For each of the project elements described below, the NMFS expects that the effects of the project actions will maintain or restore each of the habitat elements over the long-term, greater than one year. In the short term, temporary loss of riparian vegetation and increase in turbidity and sediment discharge are expected. In the long term, stream bank vegetation will be established and in-stream habitat will be created. The potential effects from the sum total of proposed actions are expected to maintain or restore properly functioning stream conditions on site and restore properly functioning conditions or not further degrade the environmental baseline within the watershed.

1. Direct Effects

Bank Reconstruction. NMFS expects that the proposed activity will have a minimal short term adverse effect to stream function and indicated fish species and will maintain or improve stream conditions in the long term.

The project will modify the current bank conditions by changing the bank composition. The project will create a continuous and regular bank treatment for 2,600 feet. The portion of the bank between low water and high water will be composed of rock riprap. The proposal includes the placement of live posts of willow or cottonwood within the rock. Modified banks using riprap may reduce value and utility to various salmonids (Beamer et. al. 1998, Peters et. al. 1998). Other various research indicates that certain variations in the type and use of riprap may be more or less detrimental (Annotated Bibliography prepared by CH2M Hill provided with BA). The size of the rock used for the lower zone will be larger than necessary for calculated shear stress at the site. The larger rock can provide larger inter-rock space. Incorporation of live willow or cottonwood posts in the rock can increase habitat structure and complexity. The project will maintain the stream bank characteristics. The stream bank is currently steep and vegetated. There will be a temporary loss of riparian vegetation. Revegetation of the site, including the establishment of in-bank trees, will require many years.

The primary use of the action area by chinook salmon is for migration. The project site does not currently support substantial juvenile rearing (BA). Most of the natural spring chinook spawning occurs

upstream in the McKenzie River. Juveniles will rear in secondary channels and backwater areas. Winter refuge can also occur within floodplains. During out-migration of spring chinook, the juveniles will move down stream orienting to shallower water, and utilizing
various in-stream structures for hiding or resting. Survival of juvenile salmonids is expected to vary with avoidance of predators, finding food and resting or minimizing stress. Backwater areas, in-stream structures, large complex woody debris structures, and high water refugia can benefit juvenile salmonids. Adverse effects of modified banks that incorporate riprap can be minimized. Irregular and large inter-rock space can provide hiding space and may contribute to the aquatic food source. Rock barbs can modify flows and create depositions or capture wood to the benefits of juvenile salmonids. The stream bank trees will be preserved at the shoreline. This will maintain a number of large trees that can contribute organic debris to the river and help to diversify the bank vegetation.

Staging area. The NMFS expects that the proposed activity will have a temporary adverse effect on the riparian area used for staging and will maintain or improve stream conditions in the long term. The staging area consists of open grassland and wetland, and forested shoreline. The staging area will be used to load and unload trucks, carry rock riprap and provide the landing site for the work barge. This activity will result in the removal of a number of mature trees along the shoreline and excavation of the bank at the barge landing site. The temporary road will be lined with erosion fabric and will cover some wetlands areas. Much of the wetland area in the staging area has been avoided. The wetland within the staging area can benefit water quality and provide high refuge habitat during flooding. The west side of the river, where the staging will take place, is in the most natural state. The bank is lower and forested. Large wood debris is evident. Chinook salmon may utilize the area for rearing. The staging area will be restored to pre-construction conditions by removing all gravel, removing erosion fabric and replanting the site. The temporary use and modification of the area is not expected to have a significant effect on the chinook salmon.

Rock barbs. The NMFS expects construction of in-stream rock structures to have a minimal, long term, beneficial effect maintaining or improving stream conditions. The structures will be composed of large rock. They will be oriented upstream which will alter the immediate stream hydrology. The rock structures are designed to deflect and slow flows at and downstream of the structure. These structures can provide backwater areas for juvenile salmonids to hide or rest. The large angular rock will create inter-rock spaces that can be used by juvenile salmonids for hiding. Out-migrating juveniles are subject to predation and need to rest and feed as they move downstream. The proposed rock barbs can benefit out-migrating salmonids. The rock barbs may capture organic debris that can contribute to habitat structure and aquatic production.

B. Effects on Critical Habitat

NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features for designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage.

Critical habitat for the indicated species includes the stream, bottom and water, and adjacent riparian within the geographic area of the species (see references Section III - Biological Information and Critical Habitat). For each of the proposed actions, NMFS expects that the effects of these actions will tend to maintain or restore properly functioning conditions in the watershed under current baseline conditions.

VI. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For the purposes of this analysis, the general action areas are the watersheds containing the project. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Future non-Federal actions that may affect the action area would include watershed actions and modification to riparian areas in the immediate vicinity and upstream of this action. The expansion of urban development at the project site is expected to be minimal. The City has proposed to develop parks on both sides of the Willamette River that would preclude additional development. Upstream development and modification to riparian areas may occur, yet no specific or immediate plans have been developed. Cumulative effects are considered minimal.

VII. Conclusion

NMFS has determined that, based on the available information, the proposed actions covered in this Opinion are not likely to jeopardize the continued existence of Upper Willamette River chinook salmon or result in the destruction or adverse modification of critical habitat. NMFS used the best available scientific and commercial data to apply its jeopardy analysis when analyzing the effects of the proposed action on the biological requirements of the species, relative to the environmental baseline, together with cumulative effects. NMFS considered the baseline conditions within the action areas and determined that conditions to support the species are not being met. The short term effects of the project include loss of riparian vegetation and increase in turbidity. The long term effects will be reestablishment of the vegetated bank and increased in-stream structure and habitat complexity. Direct mortality from this project is not expected to occur.

The NMFS expects that the project will not appreciably reduce the likelihood of survival and recovery of the species. This is based in part on the low numbers and density of juvenile chinook that may use the action area and be directly affected by the project, and the result of the project which will maintain or improve the current stream conditions for the long term.

Critical habitat for the Upper Willamette River chinook salmon has been proposed, but is not yet designated. NMFS expects that the project will not adversely modify proposed critical habitat or

appreciably reduce the functional capabilities of the stream to support the indicated fish species or reduce the likelihood of their survival or recovery.

VIII. Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information. In addition to those general minimization and avoidance measures as described in the BA, the NMFS recommends additional consideration be given to augment bank reconstruction with in-stream structures or treatments to restore rearing habitat or potential rearing habitat. The NMFS will continue to discuss options with the City.

IX. Reinitiation of Consultation

Consultation must be reinitiated if the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

X. Literature Cited

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this opinion.

Beamer, Eric M., R.A. Henderson. 1998. Juvenile Salmonid Use of Natural and Hydromodified Stream Bank Habitat in the Mainstem Skagit River, Northwest Washington. Skagit System Cooperative, for The Corps of Engineers, Seattle District.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-35, 443 p.

NMFS (National Marine Fisheries Service) 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon.

Peters, Roger J., B.R. Missildine, D.L. Low. 1998. Seasonal Fish Densities Near River Banks Stabilized with Various Stabilization Methods ? Fish Year Report of the Flood Technical Assistance Project. U.S. Fish and Wildlife Service. Lacy, Washington.

Univ. of Oregon. 1998. Willamette River Basin ? A Planning Atlas ? Version 1.0. Institute for a Sustainable Environment, University of Oregon.

XI. Incidental Take Statement

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patters such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of the Take

The NMFS anticipates that the action covered by this Opinion has more than a negligible likelihood of resulting in incidental take of Upper Willamette River chinook salmon because of detrimental effects from increased sediment levels and the potential for direct incidental take during in-water work. Effects of actions such as these are largely unquantifiable in the short term, and are not expected to be measurable as long-term effects on the species' habitat or population levels. Therefore, even though NMFS expects some low level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as these, the NMFS designates the expected level of take as "unquantifiable." Based on the information in the BA, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Opinion.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measure(s) are necessary and appropriate to minimizing take of the above species.

1. An erosion protection plan shall be developed and implemented prior to construction to reduce sediment and chemical pollutant discharges resulting from construction activities into the Willamette River potentially effecting the Upper Willamette River chinook salmon.

2. Surface water runoff from the project work and staging area shall be managed to restrict physical and chemical pollutants from entering the streams and affect Upper Willamette chinook salmon.
3. In-water work shall be isolated from the flowing water or conducted during selected time periods to reduce the potential for direct impacts to Upper Willamette River chinook salmon.
4. Disturbed riparian areas and staging areas shall be restored or treated to minimize the loss of vegetation and adverse effect on water quality, organic mater input, and large woody debris input Upper Willamette River chinook salmon.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, ODOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. Erosion protection elements indentified in the erosion protection plan, including erosion barriers, screens, surface coverage, or other appropriate techniques to intercept sediments from construction and staging areas, shall be implemented.
2. All stormwater from construction and staging area shall be treated or filtered using settling ponds, bioswales or other similar techniques.
3. Work shall be conducted during periods of the year that are less likely to have migrating juvenile salmonids, consistent with the guidance of Oregon Department of Fish and Wildlife.
4a. Riparian areas used for staging the work and otherwise disturbed from this project will be fully restored within one year of initiating the work.
4b. Plantings and integrated vegetation within the geogrid structures shall be managed to ensure 80% survival of the plant material and 80% coverage over the bank for three growing seasons.
4c. Live posting of willow or cottonwood shall occur within the rock toe (zone 3) of the bank to the maximum extent and lowest elevation feasible.